

# **Site Design Requirements for Fire Department Apparatus Access and Water Supplies**

**The intent of this document is to provide designers with commonly referenced Fire Code requirements and policies regulating the design of sites within the jurisdiction of the Bismarck Fire Department. The Fire Department's site plan review and approval is largely based on the requirements and underlying concepts of the currently adopted fire code contained within.**

This document is organized into two general areas: Apparatus Access and Water Supply. Each subject area includes the excerpts of the fire code sections followed by the adopted appendix that pertains to that section.

The Department also highly recommends an OSHA publication, Fire Service Features of Buildings and Fire Protection Systems. Chapter 2 of the manual contains an excellent background primer on site design aspects for fire protection.

**Please contact Fire Marshal Ronald Kunda if you have questions regarding these requirements. Fire Marshal Ronald Kunda can be reached at 701-355-1410 or by email at [rkunda@bismarcknd.gov](mailto:rkunda@bismarcknd.gov).**

## **IFC SECTION 503**

### **FIRE APPARATUS ACCESS ROADS**

**Definitions** – The following words and terms shall, for the purpose of this chapter and as used elsewhere in this code, have the meanings shown herein.

**FIRE APPARATUS ACCESS ROAD.** A road that provides fire apparatus access from a fire station to a facility, building or portion thereof. This is a general term inclusive of all other terms such as fire lane, public street, private street, parking lot lane and access roadway.

**FIRE LANE.** A road or other passageway developed to allow the passage of fire apparatus. A fire lane is not necessarily intended for vehicular traffic other than fire apparatus.

#### **503.1 Where required.**

Fire apparatus access roads shall be provided and maintained in accordance with Sections 503.1.1 through 503.1.3.

##### **503.1.1 Buildings and facilities.**

Approved fire apparatus access roads shall be provided for every facility, building or portion of a building hereafter constructed or moved into or within the jurisdiction. The fire apparatus access road shall comply with the requirements of this section and shall extend to within 150 feet (45 720 mm) of all portions of the facility and all portions of the exterior walls of the first story of the building as measured by an approved route around the exterior of the building or facility.

**Exception:** The fire code official is authorized to increase the dimension of 150 feet (45 720 mm) where:

1. The building is equipped throughout with an approved automatic sprinkler system installed in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3.
2. Fire apparatus access roads cannot be installed because of location on property, topography, waterways, nonnegotiable grades or other similar conditions, and an approved alternative means of fire protection is provided.
3. There are not more than two Group R-3 or Group U occupancies.

##### **503.1.2 Additional access.**

The fire code official is authorized to require more than one fire apparatus access road based on the potential for impairment of a single road by vehicle congestion, condition of terrain, climatic conditions or other factors that could limit access.

##### **503.1.3 High-piled storage.**

Fire department vehicle access to buildings used for high-piled combustible storage shall comply with the applicable provisions of Chapter 32.

## **503.2 Specifications.**

Fire apparatus access roads shall be installed and arranged in accordance with Sections 503.2.1 through 503.2.8.

### **503.2.1 Dimensions.**

Fire apparatus access roads shall have an unobstructed width of not less than 20 feet (6096 mm), exclusive of shoulders, except for approved security gates in accordance with Section 503.6, and an unobstructed vertical clearance of not less than 13 feet 6 inches (4115 mm).

### **503.2.2 Authority.**

The fire code official shall have the authority to require an increase in the minimum access widths where they are inadequate for fire or rescue operations.

### **503.2.3 Surface.**

Fire apparatus access roads shall be designed and maintained to support the imposed loads of fire apparatus and shall be surfaced so as to provide all-weather driving capabilities.

### **503.2.4 Turning radius.**

The required turning radius of a fire apparatus access road shall be determined by the fire code official. The inside turn radius of fire apparatus used by Bismarck Fire Department is 46 feet.

### **503.2.5 Dead ends.**

Dead-end fire apparatus access roads in excess of 150 feet (45 720 mm) in length shall be provided with an approved area for turning around fire apparatus.

### **503.2.6 Bridges and elevated surfaces.**

Where a bridge or an elevated surface is part of a fire apparatus access road, the bridge shall be constructed and maintained in accordance with AASHTO HB-17. Bridges and elevated surfaces shall be designed for a live load sufficient to carry the imposed loads of fire apparatus. Vehicle load limits shall be posted at both entrances to bridges when required by the fire code official. Where elevated surfaces designed for emergency vehicle use are adjacent to surfaces which are not designed for such use, approved barriers, approved signs or both shall be installed and maintained when required by the fire code official.

### **503.2.7 Grade.**

The grade of the fire apparatus access road shall be within the limits established by the fire code official based on the fire department's apparatus. Maximum grade allowed is 10 percent as per Appendix D103.2

### **503.2.8 Angles of approach and departure.**

The angles of approach and departure for fire apparatus access roads shall be within the limits established by the fire code official based on the fire department's apparatus.

### **503.3 Marking.**

Where required by the fire code official, approved signs or other approved notices or markings that include the words NO PARKING—FIRE LANE shall be provided for fire apparatus access roads to identify such roads or prohibit the obstruction thereof. The means by which fire lanes are designated shall be maintained in a clean and legible condition at all times and be replaced or repaired when necessary to provide adequate visibility.

### **503.4 Obstruction of fire apparatus access roads.**

Fire apparatus access roads shall not be obstructed in any manner, including the parking of vehicles. The minimum widths and clearances established in Section 503.2.1 shall be maintained at all times.

#### **503.4.1. Traffic calming devices.**

Traffic calming devices shall be prohibited unless approved by the fire code official.

### **503.5 Required gates or barricades.**

The fire code official is authorized to require the installation and maintenance of gates or other approved barricades across fire apparatus access roads, trails or other accessways, not including public streets, alleys or highways. Electric gate operators, where provided, shall be listed in accordance with UL 325. Gates intended for automatic operation shall be designed, constructed and installed to comply with the requirements of ASTM F 2200.

#### **503.5.1 Secured gates and barricades.**

When required, gates and barricades shall be secured in an approved manner. Roads, trails and other accessways that have been closed and obstructed in the manner prescribed by Section 503.5 shall not be trespassed on or used unless authorized by the owner and the fire code official.

**Exception:** The restriction on use shall not apply to public officers acting within the scope of duty.

### **503.6 Security gates.**

The installation of security gates across a fire apparatus access road shall be approved by the fire chief. Where security gates are installed, they shall have an approved means of emergency operation. The security gates and the emergency operation shall be maintained operational at all times. Electric gate operators, where provided, shall be listed in accordance with UL 325. Gates intended for automatic operation shall be designed, constructed and installed to comply with the requirements of ASTM F 2200.

## **IFC APPENDIX D FIRE APPARATUS ACCESS ROADS**

The provisions contained in this appendix are mandatory.

### **SECTION D101 GENERAL**

#### **D101.1 Scope.**

Fire apparatus access roads shall be in accordance with this appendix and all other applicable requirements of the International Fire Code.

### **SECTION D102 REQUIRED ACCESS**

#### **D102.1 Access and loading.**

Facilities, buildings or portions of buildings hereafter constructed shall be accessible to fire department apparatus by way of an approved fire apparatus access road with an asphalt, concrete or other approved driving surface capable of supporting the imposed load of fire apparatus weighing at least 75,000 pounds (34 050 kg).

### **SECTION D103 MINIMUM SPECIFICATIONS**

#### **D103.1 Access road width with a hydrant.**

Where a fire hydrant is located on a fire apparatus access road, the minimum road width shall be 26 feet (7925 mm), exclusive of shoulders (see Figure D103.1).

#### **D103.2 Grade.**

Fire apparatus access roads shall not exceed 10 percent in grade.

**Exception:** Grades steeper than 10 percent as approved by the fire chief.

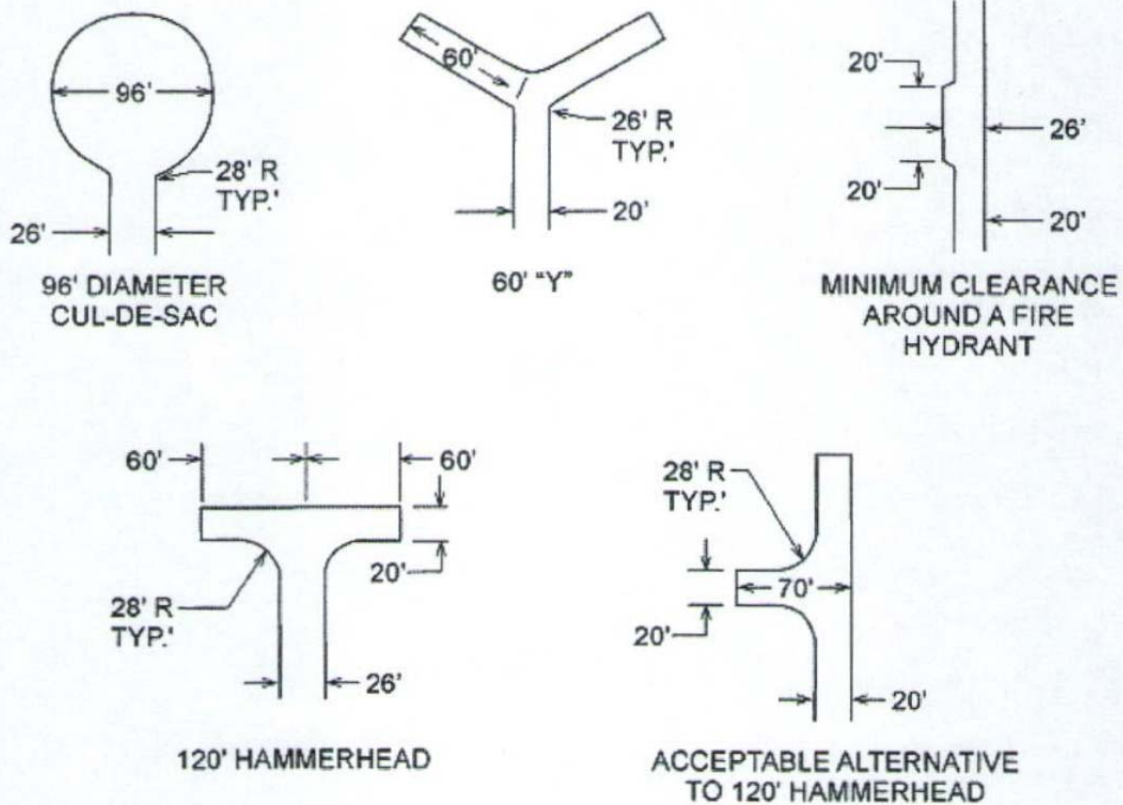
#### **D103.3 Turning radius.**

The minimum turning radius shall be determined by the fire code official. The inside turn radius of fire apparatus used by Bismarck Fire Department is 46 feet.

#### **D103.4 Dead ends.**

Dead-end fire apparatus access roads in excess of 150 feet (45 720 mm) shall be provided with width and turnaround provisions in accordance with Table D103.4.

**FIGURE D103.1  
FIRE DEPARTMENT TURNAROUNDS**



For SI: 1 foot = 304.8 mm.

**TABLE D103.4  
REQUIREMENTS FOR DEAD-END FIRE APPARATUS ACCESS ROADS**

LENGTH (feet)	WIDTH (feet)	TURNAROUNDS REQUIRED
0-150	20	None required
151-500	20	120-foot Hammerhead, 60-foot "Y" or 96-foot-diameter cul-de-sac in accordance with Figure <a href="#">D103.1</a>
501-750	26	120-foot Hammerhead, 60-foot "Y" or 96-foot-diameter cul-de-sac in accordance with Figure <a href="#">D103.1</a>
Over 750		Special approval required

For SI: 1 foot = 304.8 mm.

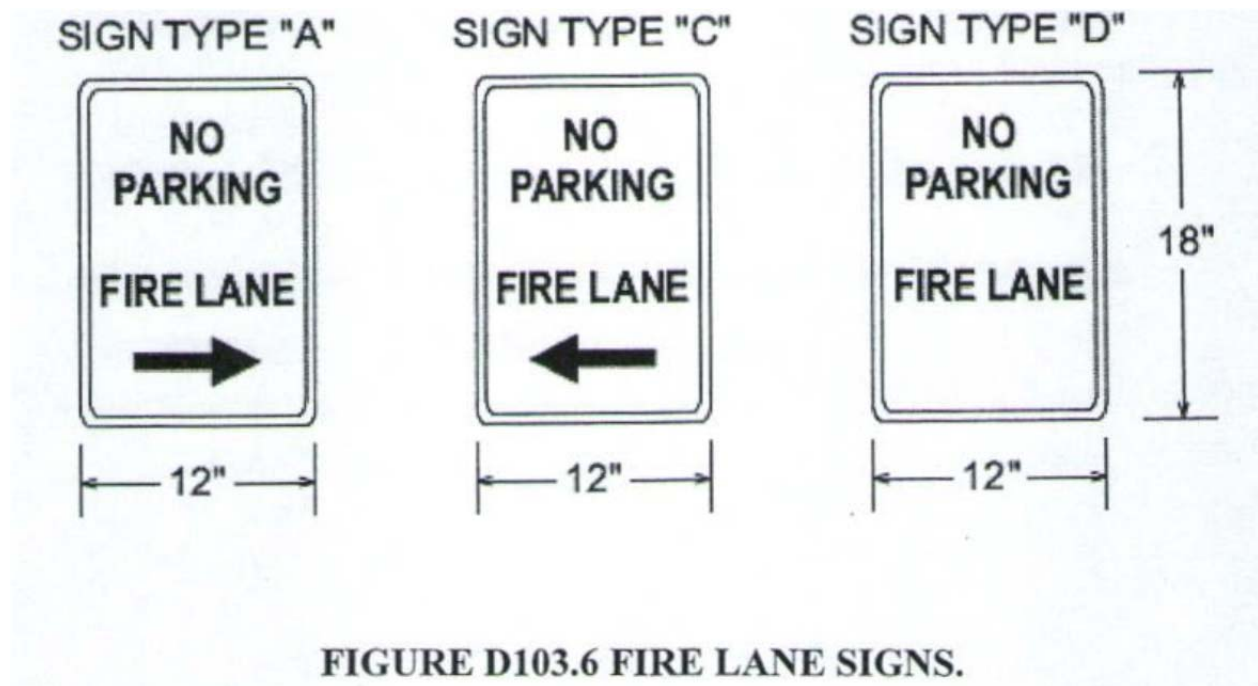
### **D103.5 Fire apparatus access road gates.**

Gates securing the fire apparatus access roads shall comply with all of the following criteria:

1. The minimum gate width shall be 20 feet (6096 mm).
2. Gates shall be of the swinging or sliding type.
3. Construction of gates shall be of materials that allow manual operation by one person.
4. Gate components shall be maintained in an operative condition at all times and replaced or repaired when defective.
5. Electric gates shall be equipped with a means of opening the gate by fire department personnel for emergency access. Emergency opening devices shall be approved by the fire code official.
6. Manual opening gates shall not be locked with a padlock or chain and padlock unless they are capable of being opened by means of forcible entry tools or when a key box containing the key(s) to the lock is installed at the gate location.
7. Locking device specifications shall be submitted for approval by the fire code official.
8. Electric gate operators, where provided, shall be listed in accordance with UL 325.
9. Gates intended for automatic operation shall be designed, constructed and installed to comply with the requirements of ASTM F 2200.

### **D103.6 Signs.**

Where required by the fire code official, fire apparatus access roads shall be marked with permanent NO PARKING—FIRE LANE signs complying with Figure D103.6. Signs shall have a minimum dimension of 12 inches (305 mm) wide by 18 inches (457 mm) high and have red letters on a white reflective background. Signs shall be posted on one or both sides of the fire apparatus road as required by Section D103.6.1 or D103.6.2.



**FIGURE D103.6 FIRE LANE SIGNS.**

**D103.6.1 Roads 20 to 26 feet in width.**

Fire lane signs as specified in Section D103.6 shall be posted on both sides of fire apparatus access roads that are 20 to 26 feet wide (6096 to 7925 mm).

**D103.6.2 Roads more than 26 feet in width.**

Fire lane signs as specified in Section D103.6 shall be posted on one side of fire apparatus access roads more than 26 feet wide (7925 mm) and less than 32 feet wide (9754 mm).

**SECTION D104****COMMERCIAL AND INDUSTRIAL DEVELOPMENTS****D104.1 Buildings exceeding three stories or 30 feet in height.**

Buildings or facilities exceeding 30 feet (9144 mm) or three stories in height shall have at least two means of fire apparatus access for each structure.

**D104.2 Buildings exceeding 62,000 square feet in area.**

Buildings or facilities having a gross building area of more than 62,000 square feet (5760 m<sup>2</sup>) shall be provided with two separate and approved fire apparatus access roads.

**Exception:** Projects having a gross building area of up to 124,000 square feet (11 520 m<sup>2</sup>) that have a single approved fire apparatus access road when all buildings are equipped throughout with approved automatic sprinkler systems.

**D104.3 Remoteness.**

Where two fire apparatus access roads are required, they shall be placed a distance apart equal to not less than one half of the length of the maximum overall diagonal dimension of the lot or area to be served, measured in a straight line between accesses.

**SECTION D105****AERIAL FIRE APPARATUS ACCESS ROADS****D105.1 Where required.**

Where the vertical distance between the grade plane and the highest roof surface exceeds 30 feet (9144 mm), approved aerial fire apparatus access roads shall be provided. For purposes of this section, the highest roof surface shall be determined by measurement to the eave of a pitched roof, the intersection of the roof to the exterior wall, or the top of parapet walls, whichever is greater.

**D105.2 Width.**

Aerial fire apparatus access roads shall have a minimum unobstructed width of 26 feet (7925 mm), exclusive of shoulders, in the immediate vicinity of the building or portion thereof.

**D105.3 Proximity to building.**

At least one of the required access routes meeting this condition shall be located within a minimum of 15 feet (4572 mm) and a maximum of 30 feet (9144 mm) from the building, and shall be positioned parallel to one entire side of the building. The side of the building on which the aerial fire apparatus access road is positioned shall be approved by the fire code official.



**D105.4 Obstructions.**

Overhead utility and power lines shall not be located over the aerial fire apparatus access road or between the aerial fire apparatus road and the building. Other obstructions shall be permitted to be placed with the approval of the fire code official.

**SECTION D106****MULTIPLE-FAMILY RESIDENTIAL DEVELOPMENTS****D106.1 Projects having more than 100 dwelling units.**

Multiple-family residential projects having more than 100 dwelling units shall be equipped throughout with two separate and approved fire apparatus access roads.

Exception: Projects having up to 200 dwelling units may have a single approved fire apparatus access road when all buildings, including nonresidential occupancies, are equipped throughout with approved automatic sprinkler systems installed in accordance with Section 903.3.1.1 or 903.3.1.2.

**D106.2 Projects having more than 200 dwelling units.**

Multiple-family residential projects having more than 200 dwelling units shall be provided with two separate and approved fire apparatus access roads regardless of whether they are equipped with an approved automatic sprinkler system.

**SECTION D107****ONE- OR TWO-FAMILY RESIDENTIAL DEVELOPMENTS****D107.1 One- or two-family dwelling residential developments.**

Developments of one- or two-family dwellings where the number of dwelling units exceeds 30 shall be provided with two separate and approved fire apparatus access roads, and shall meet the requirements of Section D104.3.

**Exceptions:**

1. Where there are more than 30 dwelling units on a single public or private fire apparatus access road and all dwelling units are equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3 of the International Fire Code, access from two directions shall not be required.
2. The number of dwelling units on a single fire apparatus access road shall not be increased unless fire apparatus access roads will connect with future development, as determined by the fire code official.

**D108****REFERENCED STANDARDS**

- |      |   |
|------|---|
| ASTM | F 2200—05 Standard Specification for Automated Vehicular Gate Construction D103.5                                 |
| ICC  | IFC—12 International Fire Code D101.5, D107.1   |
| UL   | 325—02 Door, Drapery, Gate, Louver, and Window Operators and Systems, with Revisions through February 2006 D103.5 |

**IFC SECTION 507**  
**FIRE PROTECTION WATER SUPPLIES**

**507.1 Required water supply.**

An approved water supply capable of supplying the required fire flow for fire protection shall be provided to premises upon which facilities, buildings or portions of buildings are hereafter constructed or moved into or within the jurisdiction.

**507.2 Type of water supply.**

A water supply shall consist of reservoirs, pressure tanks, elevated tanks, water mains or other fixed systems capable of providing the required fire flow.

**507.2.1 Private fire service mains.**

Private fire service mains and appurtenances shall be installed in accordance with NFPA 24.

**507.2.2 Water tanks.**

Water tanks for private fire protection shall be installed in accordance with NFPA 22.

**507.3 Fire flow.**

Fire flow requirements for buildings or portions of buildings and facilities shall be determined by an approved method.

**507.4 Water supply test.**

The fire code official shall be notified prior to the water supply test. Water supply tests shall be witnessed by the fire code official or approved documentation of the test shall be provided to the fire code official prior to final approval of the water supply system.

**507.5 Fire hydrant systems.**

Fire hydrant systems shall comply with Sections 507.5.1 through 507.5.6.

**507.5.1 Where required.**

Where a portion of the facility or building hereafter constructed or moved into or within the jurisdiction is more than 400 feet (122 m) from a hydrant on a fire apparatus access road, as measured by an approved route around the exterior of the facility or building, on-site fire hydrants and mains shall be provided where required by the fire code official.

**Exceptions:**

1. For Group R-3 and Group U occupancies, the distance requirement shall be 600 feet (183 m).
2. For buildings equipped throughout with an approved automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2, the distance requirement shall be 600 feet (183 m).

**507.5.1.1 Hydrant for standpipe systems.**

Buildings equipped with a standpipe system installed in accordance with Section 905 shall have a fire hydrant within 100 feet (30 m) of the fire department connections.

**Exception:** The distance shall be permitted to exceed 100 feet (30 m) where approved by the fire code official.

**507.5.2 Inspection, testing and maintenance.**

Fire hydrant systems shall be subject to periodic tests as required by the fire code official. Fire hydrant systems shall be maintained in an operative condition at all times and shall be repaired where defective. Additions, repairs, alterations and servicing shall comply with approved standards.

**507.5.3 Private fire service mains and water tanks.**

Private fire service mains and water tanks shall be periodically inspected, tested and maintained in accordance with NFPA 25 at the following intervals:

1. Private fire hydrants (all types): Inspection annually and after each operation; flow test and maintenance annually.
2. Fire service main piping: Inspection of exposed, annually; flow test every 5 years.
3. Fire service main piping strainers: Inspection and maintenance after each use.

**507.5.4 Obstruction.**

Unobstructed access to fire hydrants shall be maintained at all times. The fire department shall not be deterred or hindered from gaining immediate access to fire protection equipment or fire hydrants.

**507.5.5 Clear space around hydrants.**

A 3-foot (914 mm) clear space shall be maintained around the circumference of fire hydrants, except as otherwise required or approved.

**507.5.6 Physical protection.**

Where fire hydrants are subject to impact by a motor vehicle, guard posts or other approved means shall comply with Section 312.

## **IFC SECTION 312 VEHICLE IMPACT PROTECTION**

**312.1 General.**

Vehicle impact protection required by this code shall be provided by posts that comply with Section 312.2 or by other approved physical barriers that comply with Section 312.3.

**312.2 Posts.**

Guard posts shall comply with all of the following requirements:

1. Constructed of steel not less than 4 inches (102 mm) in diameter and concrete filled.
2. Spaced not more than 4 feet (1219 mm) between posts on center.
3. Set not less than 3 feet (914 mm) deep in a concrete footing of not less than a 15-inch (381 mm) diameter.
4. Set with the top of the posts not less than 3 feet (914 mm) above ground.
5. Located not less than 3 feet (914 mm) from the protected object.

**312.3 Other barriers.**

Physical barriers shall be a minimum of 36 inches (914 mm) in height and shall resist a force of 12,000 pounds (53 375 N) applied 36 inches (914 mm) above the adjacent ground surface.

## **IFC APPENDIX B**

### **FIRE-FLOW REQUIREMENTS FOR BUILDINGS**

The provisions contained in this appendix are mandatory.

#### **SECTION B101**

##### **GENERAL**

##### **B101.1 Scope.**

The procedure for determining fire-flow requirements for buildings or portions of buildings hereafter constructed shall be in accordance with this appendix. This appendix does not apply to structures other than buildings.

#### **SECTION B102**

##### **DEFINITIONS**

##### **B102.1 Definitions.**

For the purpose of this appendix, certain terms are defined as follows:

##### **FIRE-FLOW.**

The flow rate of a water supply, measured at 20 pounds per square inch (psi) (138 kPa) residual pressure, that is available for firefighting.

##### **FIRE-FLOW CALCULATION AREA.**

The floor area, in square feet (m<sup>2</sup>), used to determine the required fire flow.

#### **SECTION B103**

##### **MODIFICATIONS**

##### **B103.1 Decreases.**

The fire chief is authorized to reduce the fire-flow requirements for isolated buildings or a group of buildings in rural areas or small communities where the development of full fire-flow requirements is impractical.

##### **B103.2 Increases.**

The fire chief is authorized to increase the fire-flow requirements where conditions indicate an unusual susceptibility to group fires or conflagrations. An increase shall not be more than twice that required for the building under consideration.

##### **B103.3 Areas without water supply systems.**

For information regarding water supplies for fire-fighting purposes in rural and suburban areas in which adequate and reliable water supply systems do not exist, the fire code official is authorized to utilize NFPA 1142 or the International Wildland-Urban Interface Code.

## **SECTION B104**

### **FIRE-FLOW CALCULATION AREA**

#### **B104.1 General.**

The fire-flow calculation area shall be the total floor area of all floor levels within the exterior walls, and under the horizontal projections of the roof of a building, except as modified in Section B104.3.

#### **B104.2 Area separation.**

Portions of buildings which are separated by fire walls without openings, constructed in accordance with the International Building Code, are allowed to be considered as separate fire-flow calculation areas.

#### **B104.3 Type IA and Type IB construction.**

The fire-flow calculation area of buildings constructed of Type IA and Type IB construction shall be the area of the three largest successive floors.

**Exception:** Fire-flow calculation area for open parking garages shall be determined by the area of the largest floor.

## **SECTION B105**

### **FIRE-FLOW REQUIREMENTS FOR BUILDINGS**

#### **B105.1 One- and two-family dwellings.**

The minimum fire-flow and flow duration requirements for one- and two-family dwellings having a fire-flow calculation area that does not exceed 3,600 square feet (344.5 m<sup>2</sup>) shall be 1,000 gallons per minute (3785.4 L/min) for 1 hour. Fire-flow and flow duration for dwellings having a fire-flow calculation area in excess of 3,600 square feet (344.5m<sup>2</sup>) shall not be less than that specified in Table B105.1.

**Exception:** A reduction in required fire-flow of 50 percent, as approved, is allowed when the building is equipped with an approved automatic sprinkler system.

#### **B105.2 Buildings other than one- and two-family dwellings.**

The minimum fire-flow and flow duration for buildings other than one- and two-family dwellings shall be as specified in Table B105.1.

**Exception:** A reduction in required fire-flow of up to 75 percent, as approved, is allowed when the building is provided with an approved automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2. The resulting fire-flow shall not be less than 1,500 gallons per minute (5678 L/min) for the prescribed duration as specified in Table B105.1.

**TABLE B105.1**  
**MINIMUM REQUIRED FIRE-FLOW AND FLOW DURATION FOR BUILDINGS**

FIRE-FLOW CALCULATION AREA (square feet)					FIRE-FLOW (gallons per minute) <sup>b</sup>	FLOW DURATION (hours)
Type IA and IB <sup>a</sup>	Type IIA and IIIA <sup>a</sup>	Type IV and V-A <sup>a</sup>	Type IIB and IIIB <sup>a</sup>	Type V-B <sup>a</sup>		
0-22,700	0-12,700	0-8,200	0-5,900	0-3,600	1,500	2
22,701-30,200	12,701-17,000	8,201-10,900	5,901-7,900	3,601-4,800	1,750	
30,201-38,700	17,001-21,800	10,901-12,900	7,901-9,800	4,801-6,200	2,000	
38,701-48,300	21,801-24,200	12,901-17,400	9,801-12,600	6,201-7,700	2,250	
48,301-59,000	24,201-33,200	17,401-21,300	12,601-15,400	7,701-9,400	2,500	
59,001-70,900	33,201-39,700	21,301-25,500	15,401-18,400	9,401-11,300	2,750	
70,901-83,700	39,701-47,100	25,501-30,100	18,401-21,800	11,301-13,400	3,000	3
83,701-97,700	47,101-54,900	30,101-35,200	21,801-25,900	13,401-15,600	3,250	
97,701-112,700	54,901-63,400	35,201-40,600	25,901-29,300	15,601-18,000	3,500	
112,701-128,700	63,401-72,400	40,601-46,400	29,301-33,500	18,001-20,600	3,750	
128,701-145,900	72,401-82,100	46,401-52,500	33,501-37,900	20,601-23,300	4,000	4
145,901-164,200	82,101-92,400	52,501-59,100	37,901-42,700	23,301-26,300	4,250	
164,201-183,400	92,401-103,100	59,101-66,000	42,701-47,700	26,301-29,300	4,500	
183,401-203,700	103,101-114,600	66,001-73,300	47,701-53,000	29,301-32,600	4,750	
203,701-225,200	114,601-126,700	73,301-81,100	53,001-58,600	32,601-36,000	5,000	
225,201-247,700	126,701-139,400	81,101-89,200	58,601-65,400	36,001-39,600	5,250	
247,701-271,200	139,401-152,600	89,201-97,700	65,401-70,600	39,601-43,400	5,500	
271,201-295,900	152,601-166,500	97,701-106,500	70,601-77,000	43,401-47,400	5,750	
295,901-Greater	166,501-Greater	106,501-115,800	77,001-83,700	47,401-51,500	6,000	
—	—	115,801-125,500	83,701-90,600	51,501-55,700	6,250	
—	—	125,501-135,500	90,601-97,900	55,701-60,200	6,500	
—	—	135,501-145,800	97,901-106,800	60,201-64,800	6,750	
—	—	145,801-156,700	106,801-113,200	64,801-69,600	7,000	
—	—	156,701-167,900	113,201-121,300	69,601-74,600	7,250	
—	—	167,901-179,400	121,301-129,600	74,601-79,800	7,500	
—	—	179,401-191,400	129,601-138,300	79,801-85,100	7,750	
—	—	191,401-Greater	138,301-Greater	85,101-Greater	8,000	

For SI: 1 square foot = 0.0929 m<sup>2</sup>, 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.

a. Types of construction are based on the *International Building Code*.

b. Measured at 20 psi residual pressure.

## SECTION B106

### REFERENCED STANDARDS

ICC	IBC—12	International Building Code	B104.2, Table B105.1
ICC	IWUIC—12	International Wildland-Urban Interface Code	B103.3
NFPA	1142—12	Standard on Water Supplies for Suburban and Rural Fire Fighting	B103.3

## **IFC APPENDIX C**

### **FIRE HYDRANT LOCATIONS AND DISTRIBUTION**

The provisions contained in this appendix are mandatory.

#### **SECTION C101**

##### **GENERAL**

##### **C101.1 Scope.**

Fire hydrants shall be provided in accordance with this appendix for the protection of buildings, or portions of buildings, hereafter constructed.

#### **SECTION C102**

##### **LOCATION**

##### **C102.1 Fire hydrant locations.**

Fire hydrants shall be provided along required fire apparatus access roads and adjacent public streets.

#### **SECTION C103**

##### **NUMBER OF FIRE HYDRANTS**

##### **C103.1 Fire hydrants available.**

The minimum number of fire hydrants available to a building shall not be less than that listed in Table C105.1. The number of fire hydrants available to a complex or subdivision shall not be less than that determined by spacing requirements listed in Table C105.1 when applied to fire apparatus access roads and perimeter public streets from which fire operations could be conducted.

#### **SECTION C104**

##### **CONSIDERATION OF EXISTING FIRE HYDRANTS**

##### **C104.1 Existing fire hydrants.**

Existing fire hydrants on public streets are allowed to be considered as available. Existing fire hydrants on adjacent properties shall not be considered available unless fire apparatus access roads extend between properties and easements are established to prevent obstruction of such roads.

#### **SECTION C105**

##### **DISTRIBUTION OF FIRE HYDRANTS**

##### **C105.1 Hydrant spacing.**

The average spacing between fire hydrants shall not exceed that listed in Table C105.1.

**Exception:** The fire chief is authorized to accept a deficiency of up to 10 percent where existing fire hydrants provide all or a portion of the required fire hydrant service.

Regardless of the average spacing, fire hydrants shall be located such that all points on streets and access roads adjacent to a building are within the distances listed in Table C105.1.

**TABLE C105.1 NUMBER AND DISTRIBUTION OF FIRE HYDRANTS**

FIRE-FLOW REQUIREMENT (gpm)	MINIMUM NUMBER OF HYDRANTS	AVERAGE SPACING BETWEEN HYDRANTS <sup>a, b, c</sup> (feet)	MAXIMUM DISTANCE FROM ANY POINT ON STREET OR ROAD FRONTAGE TO A HYDRANT <sup>d</sup>
1,750 or less	1	500	250
2,000-2,250	2	450	225
2,500	3	450	225
3,000	3	400	225
3,500-4,000	4	350	210
4,500-5,000	5	300	180
5,500	6	300	180
6,000	6	250	150
6,500-7,000	7	250	150
7,500 or more	8 or more <sup>e</sup>	200	120

For SI: 1 foot = 304.8 mm, 1 gallon per minute = 3.785 L/m.

- a. Reduce by 100 feet for dead-end streets or roads.
- b. Where streets are provided with median dividers which cannot be crossed by fire fighters pulling hose lines, or where arterial streets are provided with four or more traffic lanes and have a traffic count of more than 30,000 vehicles per day, hydrant spacing shall average 500 feet on each side of the street and be arranged on an alternating basis up to a fire-flow requirement of 7,000 gallons per minute and 400 feet for higher fire-flow requirements.
- c. Where new water mains are extended along streets where hydrants are not needed for protection of structures or similar fire problems, fire hydrants shall be provided at spacing not to exceed 1,000 feet to provide for transportation hazards.
- d. Reduce by 50 feet for dead-end streets or roads.
- e. One hydrant for each 1,000 gallons per minute or fraction thereof.